



## Research Naval Postgraduate School (NPS Research Newsletter)

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VOLUME 3, NO. 6

## RESEARCH AT NPS

APRIL 2011

**Lt. Col. Neil Sanger, USAF, LTC Paul Robards, Australian Army, and LCDR Mike Touse, USN,** will be awarded doctoral degrees at the Spring 2011 graduation ceremony.

Lt. Col. Sanger's work in the Department of Meteorology examined observational data from an intensifying typhoon collected during the NPS-ONR field experiment, Tropical Cyclone Structure 2008 (TCS08), conducted out of Guam, USA, in the summer of 2008. Neil also researched data from an intensifying hurricane in the Atlantic region. An observational study of tropical-cyclone spin-up was performed using dropsondes and satellite imagery from Supertyphoon

*Jangmi* and Hurricane *Georges* and a gradient wind analysis was conducted for both storms. ELDORA data was analyzed during the tropical storm stage. Together, Sanger's study of these storms is providing a unique observational test of a new paradigm of tropical-cyclone intensification developed by his advisor, **Professor Mike Montgomery** (Meteorology) while at NPS, in collaboration with Roger Smith at the University of Munich.

The observational results support, for the first time, a fundamental theory of the intensification mechanism. These findings may spur basic improvements of tropical-cyclone intensity forecasting models. If the

*continued on p. 4*

### BROWN-BAG SEMINAR SERIES

WA-302, 1200-1300

- Wednesday, 8 June: Legal Issues of Concern to PIs
- Wednesday, 12 July: Legal Issues of Concern to PIs

### NPS AN ADAPTIVE OPTICS CENTER OF EXCELLENCE



*Distinguished Professor Brij Agrawal and Maj. Gen. Ellen M. Pawlikowski cut the cake.*

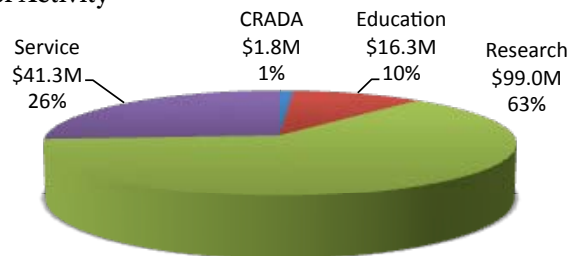
Maj. Gen. Ellen M. Pawlikowski, commander of the Air Force Research Laboratory, visited NPS on May 13 to sign an agreement between the Office of Naval Research (ONR), National Reconnaissance Office (NRO), Air Force Research Laboratory (AFRL), and NPS, establishing NPS as the Adaptive Optics Center of Excellence for national-security education and research. ONR, NRL and AFRL will commit \$1 million yearly for five years to research and education in adaptive optics.

The Spacecraft Research and Design Center consists of six laboratories for instruction and research in space-system engineering and space-operations curricula. Research emphasizes acquisition, tracking, and pointing of flexible spacecraft with optical payloads; active vibration control, isolation, and suppression using smart structures; adaptive optics and beam control; space-system design, and computer-aided design tools. These labs have been used in joint projects with Naval Satellite Operational Center, NRL, AFRL, ONR, Lockheed Martin, and Boeing.

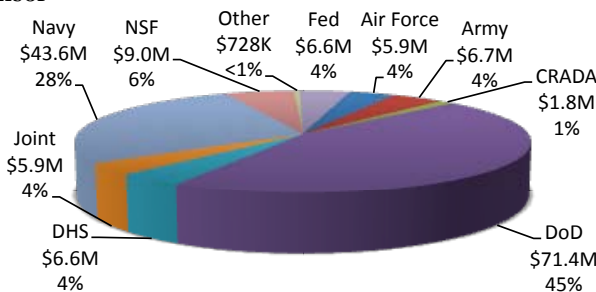
### SPONSORED PROGRAMS STATUS, APRIL 2011

FUNDS AVAILABLE: \$158.3M

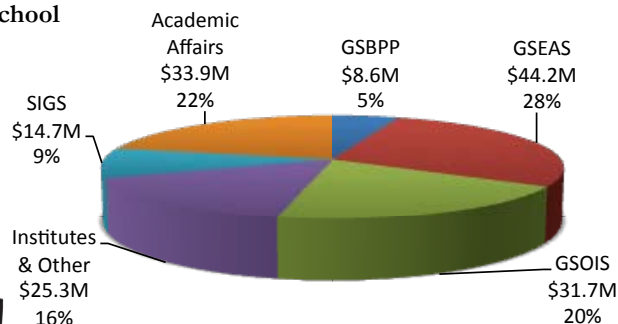
#### By Type of Activity



#### By Sponsor



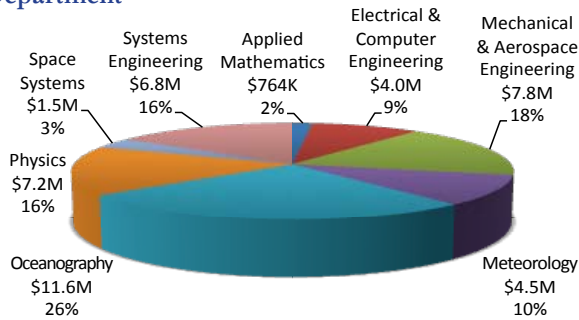
#### By School



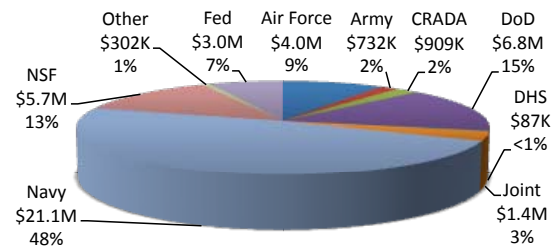
## Graduate School of Engineering and Applied Sciences

Funds available to date: \$44.2M

### By Department



### By Sponsor



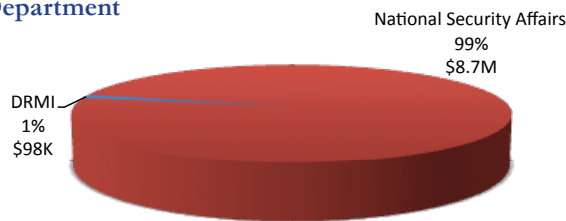
### Projects funded in April

- Wireless Networking and Communications Research, *John McEachen, ECE* (NSA)
- Efficient High-order Time-Integrators for Local High-order Discretization Methods, *Francis Giraldo, MA* (AFOSR)
- Maritime Beam Control, *Brij Agrawal, MAE* (ONR)
- Autonomous Surface Vehicles, *Doug Horner, MAE* (NSWC-Panama City)
- Pseudospectral Feedback Control for Space Applications, *Mike Ross, MAE* (AFOSR)
- South-China-Sea Signal Propagation and Ambient Noise Data Analyses, *CS Chiu, OC* (ONR)
- Nanocarbon-Reinforced Metal Armors, *Sebastian Osswald, PH* (ONR)
- Seaweb ASW Sensor Network, *Joe Rice, PH* (ONR)
- Quantitative Capabilities-based Assessment for Naval Combatant Ship Design Through M&S, *Eugene Paulo, SE* (ONR)

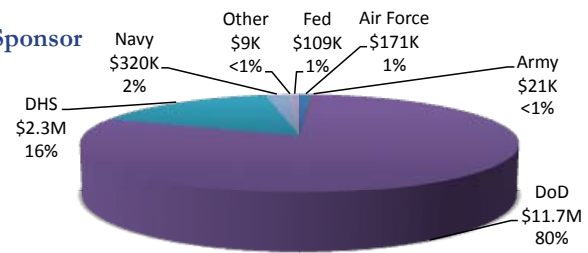
## School of International Graduate Studies

Funds available to date: \$14.7M

### By Department



### By Sponsor



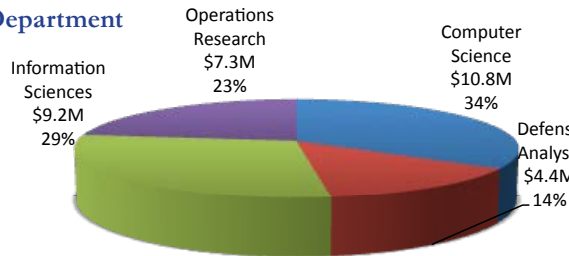
### Projects funded in April

- Establishing and Operating an Advanced Systems and Concepts WMD Center, *Anne Clunan* (DTRA)
- CCC-ASCO Partnership, *Anne Clunan* (DTRA)
- Emerging Infectious Diseases Surveillance: Evidence from Egypt, Kenya, Peru, and the US-Mexican Border, *Sophal Ear* (DTRA)
- Resource Conflicts: Strategic Commodities in Latin America, *Maiah Jaskoski* (DTRA)
- Operational Culture for Deploying Personnel Guidebook for CAOCL, *Tom Johnson* (CAOCL)
- Insurgent Strategic Communication Analysis for Open Source Center, *Tom Johnson* (OSC)
- Pakistan Strategic Dialogue VI, *Feroz Khan* (DTRA)
- Multilateral Cooperation on Nonproliferation, *Jeff Knopf* (DTRA)
- Projects on Nuclear Issues, *Sandra Leavitt* (DTRA)
- Homeland Security Master's Degree Program, *Ted Lewis* (DHS)
- DHS/FEMA Protection and National Preparedness, *Ted Lewis* (DHS/FEMA)
- Homeland Security Leadership Development Seminars, *Ted Lewis* (DHS)
- Challenges to U.S. Space-based Early Warning and Strategic Reconnaissance, *Clay Moltz* (DTRA)
- Submarine Proliferation and Future Strategic Stability, *Clay Moltz* (DTRA)
- African Security Challenges, *Jessica Piombo* (DTRA)
- Regional Educational Program in Support of the African Partnership Center, *Jessica Piombo* (USN)
- WME Innovation and Terrorism: Causes, Processes, and Predictive Indicators, Phase II, *Maria Rasmussen* (DTRA)
- Global Futures Forum, *James Russell* (DNI)
- WMD Proliferation Networks Post Aq Khan, *James Russell* (DTRA)
- U.S.-Latin America Nuclear Relations: from Commitment to Defiance, *Arturo Sotomayor* (DTRA)
- Controlling Border Spaces in the Americas, *Harold Trinkunas* (DTRA)

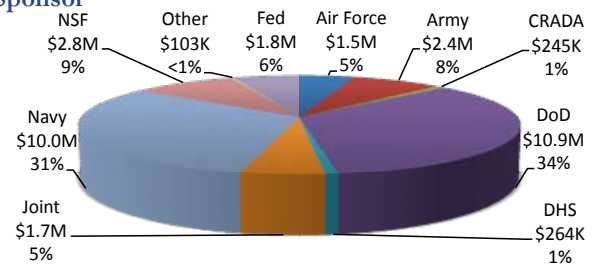
## Graduate School of Operational and Information Sciences

Funds available to date: \$31.7M

### By Department



### By Sponsor



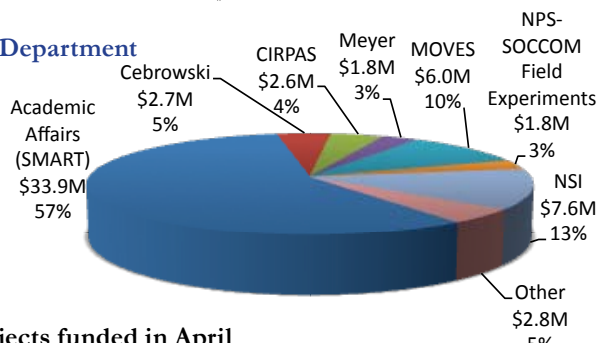
### Projects funded in April

- Navy Certifier Program Special Offering, *Karen Burke, CS* (USMC - Network Op & Security Center, NAVCENT)
- Federal Cybersecurity Research, *Cynthia Irvine, CS* (DHS)
- Xplane, *Dennis Volpano, CS* (ONR)
- Defense Counterterrorism Technology, *Nancy Ann Budden* (OSD)
- Afghan Lessons from Soviet Era, *Nancy Roberts, DA* (ONR)
- Trident Warrior 10: Sea Trials, *Shelley Gallup, IS* (ONR)
- Net-T Integration and Management onto the L3 Communications Mini-C and Rover 6 Transceivers, *Shelley Gallup, IS* (Army Unmanned Aircraft Systems)
- Purple Rain, *Bill Roeting, IS* (USAF Adv Capabilities Office)
- Large-scale Optimization, *Gerald Brown, OR* (AFOSR)
- Military Applications of Optimization, *Matt Carlyle, OR* (ONR)
- DoD Transportation for NGO Cargo, *Ned Dimitrov, OR* (U.S. European Command)
- Analytic TLM-AT Support to M777 Howitzer PM, *Tom Lucas, OR* (USMC - MARCORSYSCOM)
- Seed Center Support to Cultural Geography Scenario and Analysis, *Paul Sanchez, OR* TRAC-Monterey
- Advanced Test and Evaluation in Support of DoD Enterprise, *Christian Silvestrini, OR* (AFIT)
- Defending Independent Infrastructure Systems the University of Texas at Austin, *Kevin Wood, OR* (UT-Austin)

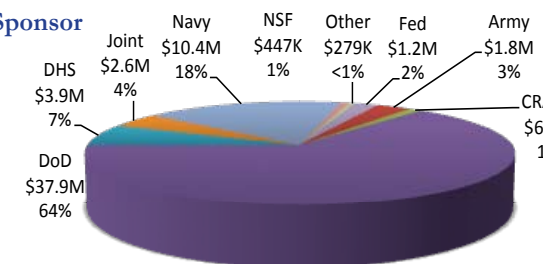
## Research and Education Institutes, Centers, and Other

Funds available to date: \$25.3M

### By Department



### By Sponsor



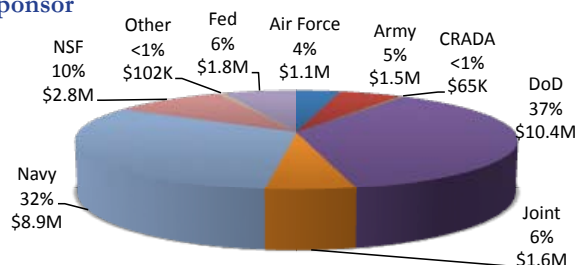
### Projects funded in April

- Global Wargame: Warfighting Assessment, *Scott Miller, Cebrowski* (SPAWAR)
- DMEA Development, *Cliff Whitcomb, Meyer Institute*, (OSD)
- Anti-Submarine Warfare Support for C4I System Interoperability and Track Visualization, *Don Brutzman, MOVES* (NAVSEA)
- Discrete-Event Simulation Approach to Cultural Geography Modeling, *Arnold Buss, MOVES* (TRAC-Monterey)
- Field-Experiments for Special Operations, *Ray Buettner, NPS-USSOCCOM* (OSD)
- Multi-Intuitional Semi-Structured Learning Environment, *Ray Buettner, NPS-USSOCCOM* (ARL)
- UAV Operations at Camp Roberts, *Bob Bluth, CIRPAS* (NAWC-Weapons)

## Graduate School of Business and Public Policy

Funds available to date: \$8.6M

### By Sponsor



### Projects funded in April

- Seminar in Defense Budget Analysis, *Doug Brooke* (CIA)
- Business-Case Analysis for SPA, *Chip Franck* (AFRL)
- DASN (A&LM)-Chair of Acquisition and Research Program, *Keith Snider* (DASN)



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tropical-cyclone intensification process is



Lt. Col. Neil Sanger, USAF

represented in both theory and models, forecasters at the National Hurricane Center and Joint Typhoon

Warning

Center will have improved tools for making reliable intensity forecasts.

Improved forecasts are essential for protecting the lives of military and civilian personnel and their family members living in tropical-cyclone prone areas along the U.S. Gulf Coast and Atlantic Coast and in the western North Pacific Ocean. Better forecasts are also key to maximizing the safety of multi-million dollar military aircraft based in other tropical cyclone-prone areas such as Andersen Air Base, Guam and U.S. Navy

ships transiting the western Pacific, Gulf of Mexico, and Atlantic Ocean basins.

Lt. Col. Sanger is squadron Commander of the 16th Weather Squadron in the Air Force Weather Agency at Offutt Air Force Base, Nebraska.

The doctoral work of LTC Paul Robards, Australian Army, examines the practice of many large organizations that rely on manual assignment processes, despite the theory of bounded rationality indicating that time and cognitive constraints would limit the quality of assignments. Robards's work was supervised by **Professor Bill Gates**, Dean of the Graduate School of Business and Public Policy.

Robards's research used participant experiments to explore the effect of information load on assignment quality: participants, motivated by induced value theory, performed the role of decision makers; and information load was identified by the number of personnel requiring assignment and the number of attributes to be considered. Results varied considerably between participants, despite a relatively homogenous group of participants and low information loads compared to what would be experienced in actual military assignment processes. Having analyzed the shortcomings of manual assignment processes, this research examined two-sided matching as the basis for a decision support system. It was demonstrated that two-sided matching could be used to assign personnel to positions in hierarchies. Multi-attribute utility functions were used to generate position preferences based on a variety of attributes, some relevant to the organization and others to its subordinate units.



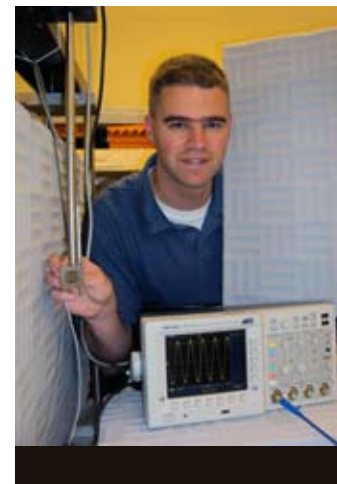
Robards and wife at investiture as Member of the Order of Australia

Computational experiments showed that assignments are responsive to the utility function weights, allowing decision makers to quickly examine various assignment sets under different conditions. The effects of preference list indifference on two-sided matching were also examined.

Robards was a NPS Distinguished Graduate and NPS Outstanding International Student upon receiving a master's degree in manpower-systems analysis from NPS in 2001 and returned

for further research in 2004–2006. He is currently a Staff Officer Grade 1, Workforce Analysis, in the Australian Army and has been appointed a Member of the Order of Australia for his contributions to the Australian Army and Defense Force in the field of workforce modeling, forecasting, and analysis.

The doctoral dissertation of LCDR Touse, USN, "Design, Fabrication, and Characterization of a Microelectromechanical, Directional Micro-



LCDR Touse with MEMS microphone and receiver

phone," involves the design, fabrication, and testing of a millimeter-sized microphone that is able to determine the origin of a sound source using a structure based on the ear of the *Ormia ochracea*. LCDR Touse's research was supervised by **Professor Gamani Karunasiri**, Department of Physics.

While humans generally determine sound direction by sensing how long it takes for the sound to travel between their ears, insects are so small that sound reaches both ears at the same time. The *Ormia ochracea* fly is able to overcome this problem with a

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Lt Col Sanger and Japanese media before flying into Typhoon Sinlaku. Below: Supertyphoon Jangmi from inside the eye.



## NPS FACULTY SUPPORT MARINE CORPS TRAINING EXERCISES

NPS faculty and staff participated in the biannual Weapons and Tactics Instructors course conducted this April by the Marine Aviation Weapons and Tactics Squadron One (MAWTS-1). MAWTS-1 provides standardized training in all aspects of the employment of Marine aviation units toward the accomplishment of their assigned mission, assists in the development of aviation weapons and tactics and provides for the evaluation of other aviation units. The Marine students take what they learn back to their units, where they, in turn, become the teachers. Each exercise is designed to simulate realistic urban combat situations. MAWTS-1 also conducts two Desert Talon exercises per year.

As participants in MAWTS-1, Distinguished Professor **Nancy Haegel** and **LT Marty Blomberg, USN**, a master's student in the combat systems curriculum (physics department), traveled to the



*Predator unmanned vehicle takes off at Camp Roberts. Below left: UAV camera on Pelican*



ers Fighters to prepare them for deployment overseas.

The training from the SUAV provides intelligence personnel, tacticians, fielded forces and unit commanders in their respective collection and decision making processes to further provide realism to their training.



*LT Blomberg checks activation of VMIFF device at Marine Corps Air Station in Yuma, AZ.*

infrared beacon that can be remotely or locally triggered to provide fratricide mitigation and situational awareness during close air support. Working with MAWTS instructors and the Marine Corps



*NPS device on vehicle used for targeting for Marine Corps pilots and forward air controllers.*

Marine Corps Air Station, Yuma, to support a demonstration and evaluation of the NPS vehicle-mounted identification, friend or foe (V M I F F) device.

VMIFF is a near-infrared and midwave-infrared beacon that can be remotely or locally triggered to provide fratricide mitigation and situational awareness during close air support. Working with MAWTS instructors and the Marine Corps Experimentation Center of MARFORPAC, LT Blomberg coordinated the demonstration and use of VMIFF during live fire and day-time and night time tracking exercises. VMIFF

was developed at NPS in collaboration with industrial partners at Syvax Design Inc. The next test will be at the Bold Quest combat identification exercise in September of this year.

Bob Bluth and CIRPAS staff also participated in the course, supporting the MAWTS-1 class 2-11(WTI 2-11) at Camp Roberts. CIRPAS provides the Pelican Surrogate (SUAV) to simulate the Predator unmanned, aerial vehicle (UAV) and provide quality video from a sensor aboard the aircraft to a ground-control station. The purpose is to train the Marine MAWTS-1 students in the use of UAV video to call in air strikes with live F-18 and Harri-

*Ph.Ds, continued from p. 4*

unique hearing system in which the two ears are connected by a flexible coupling. This causes the ears to respond as if they were spaced much further apart, and the fly is able to acoustically locate chirping crickets so it can lay its parasitic larvae on their backs.

LCDR Touse is developing a micro-electromechanical systems (MEMS) -based microphone that mimics the fly's hearing system to determine the direction of a sound source. LCDR Touse and several other NPS students design and simulate the devices with computer models. The designs are then fabricated from silicon using standard semiconductor processes and returned to NPS for experiments. The ultimate goal of the research is to produce a device that would be small enough for individual soldiers to carry to instantly locate the direction of enemy snipers. This technology has also drawn interest from the medical community to potentially monitor individual troop exposure to large blasts, and from the intelligence community to be used as an unattended sensor in remote locations.

Out of 60 other projects, Touse's work was selected for demonstration during the 2009 IC Tech Expo held at the U.S. Capitol in Washington, D.C., and was viewed by seventeen congressmen and more than 1,400 congressional and capitol staff. The work has been published in *Applied Physics Letters* and *Proceedings of the 2010 IEEE Sensors Conference*, and three NPS students on the project have received SPAWAR student fellowships.

LCDR Touse is an Engineering Duty Officer and will report to the Program Executive Office for Integrated Warfare Systems in Washington, D.C., upon graduation in May.



## COMPUTER SCIENCE

**Denning, P. J.,** & Holmes, N. (2011). Computer science: An interview. *Computer*, 44(3), 96-95.

**Thuy D. Nguyen** and **Cynthia E. Irvine**, "A High Assurance Adaptive Multi-Domain Security Architecture for Cloud Computing," 2011 Department of Defense Intelligence Information Systems (DoDIIS) Worldwide Conference, May 1-5, 2011.

## ELECTRICAL AND COMPUTER ENGINEERING

**Thulasiraman, P.,** Chen, J., & Shen, X. (2011). Multipath routing and max-min fair QoS provisioning under interference constraints in wireless multihop networks. *IEEE Transactions on Parallel and Distributed Systems*, 22(5), 716-728.

**R. A. Romero, J. Bae,** and N. Goodman, "Theory and Application of SNR and Mutual Information Matched Illumination Waveforms," *IEEE Transactions on Aerospace and Electronic Systems*, vol. 47 num 2 (Apr 2011), pp 912-927.

Distinguished Professor **Jon T. Butler** was a recipient of the outstanding paper award" from the Transactions on System LSI Design Methodology for the paper, S. Nagayama, T. Sasao, and J. T. Butler, "Programmable architectures and design methods for two-variable numeric functions generators," *IPSI Transactions on System LSI Design Methodology*, Vol. 3, No. 2, pp. 118-129, Feb. 2010.

## GRADUATE SCHOOL OF BUSINESS AND PUBLIC POLICY

**DiRenzo, M. S.,** Greenhaus, J. H., & Weer, C. H. (2011). Job level, demands, and resources as antecedents of work-family conflict. *Journal of Vocational Behavior*, 78(2), 305-314.

**Henderson, D. R.** (2011). At home: A short history of private life. *Policy Review*, (165), 108-112.

**Kang, K., Doerr, K. H., Apte, U., & Boudreau, M.** (2010). Decision support models for valuing improvements in component reliability and maintenance. *Military Operations Research*, 15(4), 55-68.

**Snider, K. F.** (2011). On the problem of adopting pragmatism in public administra-

tion. *Administration & Society*, 43(1), 133-141.

Hanson, J., **Russell, J.,** Ah Yun, K., & **Lindsey, L. L. M.** (2011, February). The effect of comforting message type and empathy on message evaluations. Paper presented at the annual meeting of the Western States Communication Association, Monterey, CA.

**Russell, J. C.,** Smith, S. W., **Lindsey, L. L. M.,** Novales, W., & Hanson, J. (2011, February). Using the EPPM to evaluate culturally relevant kernicterus messages. Paper presented at the annual meeting of the Western States Communication Association, Monterey, CA.

**DiRenzo, M. S.,** & Greenhaus, J. H. (May, 2011). The impact of protean career orientation on work-life balance. In L. L. Koppes Bryan, & S. K. Schneider (Chairs), *Decent Work and Beyond: Work-Life Effectiveness [Work-Family Balance] in Relation to Positive Employee Work and Personal Outcomes*. European Association of Work and Organizational Psychology Conference, Maastricht, Netherlands.

## MECHANICAL AND AEROSPACE ENGINEERING

Back, S-C, **Hobson, G. V.,** Song, S-J, **Millsaps, K. T.,** "Effect of Reynolds Number and Surface Roughness Magnitude & Location on Compressor Cascade Performance," Accepted for publication in the *ASME Journal of Turbomachinery*, December 2010

Gannon, A. J., **Hobson, G. V.** and Davis, W. L., "Axial Transonic Rotor and Stage Behavior Near the Stability Limit," Accepted for publication in the *ASME Journal of Turbomachinery*, September 2010.

Slegers, N., & **Yakimenko, O. A.** (2011). Terminal guidance of autonomous parafoils in high wind-to-air-speed ratios. Proceedings of the *Institution of Mechanical Engineers Part G-Journal of Aerospace Engineering*, 225(G3), 336-346.

Yoon, H., Bateman, B. E., & **Agrawal, B. N.** (2011). Laser beam jitter control using recursive-least-squares adaptive filters. *Journal of Dynamic Systems Measurement and Control-Transactions of the Asme*, 133(4), 041001.

## METEOROLOGY

**Hacker, J. P., Ha, S., Snyder, C.,** Berner, J.,

**Eckel, F. A.,** Kuchera, E., et al. (2011). The U.S. air force weather agency's mesoscale ensemble: Scientific description and performance results. *Tellus Series A-Dynamic Meteorology and Oceanography*, 63(3), 625-641.

**Hacker, J. P., Snyder, C., Ha, S., & Pocerich, M.** (2011). Linear and non-linear response to parameter variations in a mesoscale model. *Tellus Series A-Dynamic Meteorology and Oceanography*, 63(3), 429-444.

Kalogiros, J., & **Wang, Q.** (2011). Aircraft observations of sea-surface turbulent fluxes near the California coast. *Boundary-Layer Meteorology*, 139(2), 283-306.

## NATIONAL SECURITY AFFAIRS

"Civilian Control of the Armed Forces in Democratic Latin America: Military Prerogatives, Contestation, and Mission Performance in Peru." *Armed Forces & Society*, published online February 18, 2011; forthcoming in hardcopy.

Assistant Professor **Sophal Ear** was honored by the World Economic Forum in Geneva, Switzerland, as a Young Global Leaders for 2011. The annual award recognizes up to 200 outstanding young leaders worldwide for professional accomplishments, commitment to society, and potential to contribute to shaping the future of the world.

## OCEANOGRAPHY

**Chu, P. C., and Fan, C.** (2011). Probability density function of underwater bomb trajectory deviation due to stochastic ocean surface slope. *Journal of Dynamic Systems Measurement and Control-Transactions of the ASME*, 133(3), 031002.

**Chu, P.C.,** 2011: Global upper ocean heat content and climate variability. *Ocean Dynamics*, in press.

Park, S., **P.C. Chu,** J.-H. Lee, 2011: Interannual-to-interdecadal variability of the Yellow Sea Cold Water Mass in 1967–2008: Characteristics and seasonal forcings. *Journal of Marine Systems*, in press.

**Chu, P.C.,** and C.W. Fan, 2011: Maximum angle method for determining mixed layer depth from seaglider data. *Journal of Oceanography*, Oceanographic Society of Japan, 67, DOI: 10.1007/s10872-011-0019-2.

**Chu, P.C.**, and K. Kyriakidis, 2011: Chemical spill characteristics in the San Diego Bay. *Marine Technology Society Journal*, 45 (2), 52-58.

Galanis, G., **P.C. Chu**, G. Kallos, 2011: Statistical post processes for the improvement of the results of numerical wave prediction models. A combination of Kolmogorov, Zurbenko, and Kalman filters. *Journal of Operational Oceanography*, 4 (1), 23-31 (paper download).

**Chu, P.C.**, J.M. Bushnell, C.W. Fan, and K.P. Watson, 2011: Modeling of underwater bomb trajectory for mine clearance. *Journal of Defense Modeling and Simulation*, The Society for Modeling and Simulation International, 8 (1), 25-36.

Fiorino, S.T., R. M. Randall, R. J. Bartell, A.D. Downs, **P.C. Chu**, and C. W. Fan, 2011: Climate change: anticipated effects on high-energy, laser-weapon systems in maritime environments. *Journal of Applied Meteorology and Climatology*, American Meteorological Society, 50, 153-166.

Geiman, J. D., Kirby, J. T., Reniers, A. J. H. M., & **MacMahan, J. H.** (2011). Effects of wave averaging on estimates of fluid mixing in the surf zone. *Journal of Geophysical Research-Oceans*, 116, C04006.

## OPERATIONS RESEARCH

**Brown, G., Carlyle, M., Abdul-Ghaffar, A., & Kline, J.** (2011). A defender-attacker optimization of port radar surveillance. *Naval Research Logistics*, 58(3), 223-235.

Newman, A. M., **Rosenthal, R. E., Salm-eron, J., Brown, G. G., Price, W., Rowe, A.**, et al. (2011). Optimizing assignment of tomahawk cruise missile missions to firing units. *Naval Research Logistics*, 58(3), 281-295.

**Radko, T.**, & Stern, M. E. (2011). Finescale instabilities of the double-diffusive shear flow. *Journal of Physical Oceanography*, 41(3), 571-585.

**Washburn, A.**, & Ewing, L. T. C. P. L. (2011). Allocation of clearance assets in IED warfare. *Naval Research Logistics*, 58(3), 180-187.

Assistant Professor **LTC Scott Nestler, USA**, was an invited speaker at the INFORMS Conference on Business Analytics and Operations Research in Chicago. His presentation, "Analytics in the Fog of War," was based on experi-

ence as the Chief of Strategic Assessments for Multi-National Force - Iraq in 2009.

## PHYSICS

Baird, L., Ong, C. P., Cole, R. A., **Haegel, N. M.**, Talin, A. A., Li, Q., et al. (2011). Transport imaging for contact-free measurements of minority carrier diffusion in GaN, GaN/AlGaIn, and GaN/InGaIn core-shell nanowires. *Applied Physics Letters*, 98(13), 132104.

**Goodman, G. P.**, DeZee, K. J., **Burks, R.**, Waterman, B. R., & Belmont, P. J., Jr. (2011). Epidemiology of psychiatric disorders sustained by a U.S. army brigade combat team during the Iraq war. *General Hospital Psychiatry*, 33(1), 51-57.

**J.R. Harris, K.L. Ferguson, J.W. Lewellen, S.P. Niles, B. Rusnak, R.L. Swent, W.B. Colson, T.I. Smith, C.H. Boulware, T.L. Grimm, P.R. Cunningham, M.S. Curtin, D.C. Miccolis, D.J. Sox, and W.S. Graves.** Design and operation of a superconducting quarter-wave electron gun, *Physical Review Special Topics – Accelerators and Beams* 14, 053501 (2011).

B.R. Poole and **J.R. Harris.** Cerenkov Radiator Driven by a Superconducting RF Electron Gun, 2011 Particle Accelerator Conference, New York City, 28 March 2011

**Bradley L. McCarthy**, Professor **Chris Olsen**, and Research Associate **Angela Kim** presented "Creation of bathymetric maps using satellite imagery" at the SPIE Conference on Defense, Security, and Sensing, Orlando, FL, April 2011.

Research Associate **Krista Lee**, Professor **Chris Olsen**, Professor **Fred Kruse**, and Research Associate **Angela Kim** presented "Using WorldView-2 to determine ocean bottom-type and bathymetry," SPIE Conference on Defense, Security, and Sensing, Orlando, FL, April 2011.

Professor **Fred Kruse**, Christopher Elvidge, "Identification and mapping of night lights signatures using hyperspectral data," SPIE Conference on Defense, Security, and Sensing, Orlando, FL, April 2011.

Professor **Chris Olsen**, **Cecelia McConnon**, Research Associate **Angela Kim** "High-spatial resolution, bidirectional-reflectance retrieval using satellite data,"

SPIE Conference on Defense, Security, and Sensing, Orlando, FL, April 2011.

Research Associate **Angela Kim**, and Professor **Chris Olsen** presented "Simulated lidar waveforms for the analysis of light propagation through a tree canopy," American Society for Photogrammetry and Remote Sensing Annual Conference, Milwaukee, May 2011.

Barton, R.J., **Smith, K.B.**, and Vincent, H.T., "A characterization of the scattered acoustic intensity field in the resonance region for simple spheres," *J. Acoust. Soc. Am.* 129, pp. 2772-2784, 2011.

Dossot, G.A., Miller, J.H., Potty, G.R., **Smith, K.B.**, Badiy, M., and Lynch, J.F., "Three dimensional parabolic equation modeling of acoustic intensity fluctuations due to internal wave phenomena," *J. Acoust. Soc. Am.* 129, pp. 2457, 2011.

Dossot, G.A., Miller, J.H., Potty, G.R., **Smith, K.B.**, Lynch, J.F., Lin, Y.-T., Newhall, A.E., and Badiy, M., "Simulating Acoustic Pressure and Intensity in a Strong Internal Wave Field," Proceedings of 10th International Conference on Theoretical and Computational Acoustics, Taipei, Taiwan, 25-28 April, 2011.

Barton, R.J. and **Smith, K.B.**, "A Characterization of Scattered Acoustic Intensity Vector Fields in the Resonance Region," Proceedings of 10th International Conference on Theoretical and Computational Acoustics, Taipei, Taiwan, 25-28 April, 2011.

## SYSTEMS ENGINEERING

**Huynh, T. V.** (2011). Orthogonal array experiment in systems engineering and architecting. *Systems Engineering*, 14(2), 208-222.

Please submit faculty research news items to [research@nps.edu](mailto:research@nps.edu).



## TECHNICAL SERVICES AGREEMENT (TSA)

**Title: Improving Regional VOC Emission Estimate**

**Partner: University of California, Berkeley**

**PI: Hafidi Jonsson, CIRPAS**

Summary: NPS/CIRPAS will provide pre-flight coordination, flight coordination, range management, flight safety and facility management of Berkeley for the Regional VOC Emission Estimate at CIRPAS facility and will ensure compliance with all CIRPAS policies and procedures.

## MEMORANDUM OF UNDERSTANDING (MOU)

**Partner: National Science Foundation**

**NPS POC: Bob Bluth, CIRPAS**

Summary: NPS/CIRPAS Twin Otter and A-10 will be made available to NSF as part of the Deployment Pool to support National Research Facilities. These aircraft will function as airborne science platforms for various research projects when schedule and cost considerations are appropriate.

**Partner: Naval Medical Administrative Unit**

**NPS POC: Ryan Greve, Radiation Safety Officer**

Summary: Naval Medical Administrative Unit will act as the custodian of the radiation health records that are required to be maintained as part of the NPS radiation protection program.

## PATENT APPLICATIONS

“Automatic Parafoil Turn Calculation Method and Apparatus,” Navy Case No. 20110006.

Inventors: **Oleg Yakimenko**, Department of Mechanical and Aerospace Engineering

“Method and Apparatus for Parafoil Guidance That Accounts for Ground Winds,” Navy Case No. 20110007.

Inventors: **Oleg Yakimenko**, Department of Mechanical and Aerospace Engineering, and **Eugene Bourakov**, Department of Information Sciences

“Instantaneous Wireless Network Established by Simultaneously Descending Parafoil,” Navy Case No. 20110009.

Inventors: **Alex Bordetsky**, Department of Information Sciences, **Oleg Yakimenko**, Department of Mechanical and Aerospace Engineering, and **Eugene Bourakov**, Department of Information Sciences

“Automatically Guided Parafoil Directed To Land On A Moving Target,” Navy Case No. 20110010.

Inventors: **Oleg Yakimenko**, Department of Mechanical and Aerospace Engineering, and **Eugene Bourakov**, Department of Information Sciences

## TECHNICAL REPORTS PUBLISHED

NPS-SE-11-001	An Architecture of an Autonomous, Weaponized Unmanned Aerial System (UAS)	P. Frau, R. Howell, I. Kelly, et al.
NPS-SE-11-002	Roving UAV IED Interdiction System	W. Bechtel, N. Hathaway, T. Jerdee, et al.
NPS-OC-11-003	Physical, Nutrient, and Biological Measurements of Coastal Waters off Central California in July 2010	T. Rago, R. Michisaki, B. Marinovic, et al.
NPS-DA-11-001	Gangs and Guerrillas: Ideas from Counterinsurgency and Counterterrorism	M. Freeman, H. Rothstein

*Technical reports may be obtained at <http://www.nps.edu/Research/TechReports.html>*

## ELECTRONIC PROPOSAL SUBMISSIONS: PROCESS

The use of electronic means to submit proposals to competitive solicitations has increased dramatically within the last year. The NSF site, FastLane, has been used for many years, but more and more agencies are either utilizing Grants.Gov or their own sites to assure timely submission of proposals in formats specified. Staff in the RSPO are well-versed in utilizing these portals and do complete the submission on behalf of NPS. Staff will also assist with formatting and budget development.

Due to the increase in electronic submissions and the fact that all submissions are time/date stamped to assure arrival by the date set by the sponsor, it is necessary that the RSPO be alerted if a PI is planning a submission and that all necessary documents be received in the RSPO with sufficient time to review and submit. We request that the PI notify the RSPO as soon as they have decided on submission and work out a timeline with the staff

to complete all documentation. All documentation must be completed at least twenty-four hours prior to submission, which means that the RSPO should receive input from the PI no later than three working days prior to submission. The RSPO will assure that submission requirements are met.

An electronic submission of a proposal does not preclude the necessity for Department/Institute/Dean review. If the signed Standard NPS Proposal Page is not received with the proposal documentation, the RSPO will staff the proposal via email to the PI's Chair/Dean or Director/Dean as applicable prior to submitting the proposal electronically to the sponsor.

Again, TIMELINESS in receipt of documentation is a necessity to assure both NPS and sponsor submission requirements can be met. Questions, please email [research@nps.edu](mailto:research@nps.edu).